

REMARKS / ARGUMENTS

In the above-identified Office Action the claims 13-18 have been objected to as being of improper dependent form. Applicant has amended claims 13-18 so that they now properly depend either directly or indirectly from Claim 12 and, as such, Applicant believes that this objection is obviated.

Claim 12 has been rejected as unpatentable over Rickard in view of Jonninen. Applicant believes that the claims as now amended define over the art. More particularly Applicant has amended Claim 12 so that it now recites that the waste product is heated in one vessel and then, after the gas escapes and the ammonia cools down, it is then introduced into a second vessel where the excess gas is absorbed. This is not taught by Rickard where all the gas is escaped in one vessel, anaerobic digester 14, and then transferred to reactor 24 where an alkaline reagent is introduced. Therefore, according to Rickard's process, the carbon dioxide and methane escape during the process in the first vessel while the ammonium exits in the second vessel. This is different from the subject invention where both the carbon dioxide and the ammonia are removed in the first vessel.

The Examiner stated that Rickard describes a process, wherein waste water is treated thermally under sub atmospheric pressure and at temperatures between 40 and 90°C. This results in a discharge of CO₂ and NH₃ as gasses. The resulting gas mixture is cooled and introduced into an aqueous absorption medium. The Examiner's summary of Rickard involves a single stage process in one single vessel, where the gases escape within one step. However, this characterization of Rickard is incorrect.

The Rickard patent describes a process as illustrated in Fig. 1. Therein, concentrated sludge 13 is digested biologically in a first vessel, which is anaerobic digester 14, under anaerobic conditions (see Rickard, column 4, line 34 etc.)

Decomposable organic substances are disintegrated into CO_2 and CH_4 , both gaseous. The nitrogen is transformed into NH_3 , which remains dissolved in water (Col. 4, line 37-47).

Fig. 1 clearly shows that this step only results in the escape of gaseous CH_4 and CO_2 . Both gases leave the digester. The ammonia NH_3 clearly remains dissolved in the aqueous phase, partially as NH_4^+ salt.

The liquid parts, which contain the ammonia but not the carbon dioxide, are transferred (feed 23) into the reactor 24. Additionally, an excess of alkaline reagents, preferably lime, is introduced into the reactor 24 (see Rickard, column 4, line 48-51). Thus, the remaining ammonia salts are transformed into free or dissolved NH_3 . This represents a second process step in a second vessel.

The transformation into gaseous ammonia according to Rickard is only possible due to the addition of chemicals, preferably lime. Said transformation happens apart from the release of CH_4 and CO_2 , which are obtained as a gas mixture, not as separate gases.

The liberation of gaseous ammonia is supported by using sub atmospheric pressure and by an increased temperature. Concerning the pressure, an interval of 10-28 inches Hg (about 33-95 kPa) is indicated. The temperature should be above the boiling point of the mixture (see Rickard, column 4, lines 57-66 and column 6, lines 35-37).

Using Rickard's process, only the liberated ammonia can be trapped as free ammonia, as ammonia dissolved in water or as a salt, preferably by transfer into acid(s), preferably sulphuric acid (see Rickard, column 4, line 66 to column 5, line 7).

Overall, the process according to Rickard has multiple steps and requires a multitude of vessels before ammonia is liberated, Gaseous CO_2 and gaseous CH_4 are

liberated in different vessels and their liberation is based on different mechanisms. The CH₄ production and liberation take place simultaneously with the CO₂ production and liberation and both (CH₄, CO₂) result from biological digestion. The gases are obtained as a mixture, which would require separation before the separate compounds could be used further.

Furthermore, Rickard's process clearly requires the addition of alkaline reagent such as lime (CaO). Moreover, NH₃ is used to increase the nitrogen concentration of the sludge from 1-2% to 10% after absorption of the waste water in the sludge in order to make it useable as fertilizer.

The patent to Jonninen solely refers to a method of accelerated biodigestion of biological matter into compost. The gas, which is liberated (without mentioning its composition) is collected, cooled and circulated through the material stack. Thus, oxygen concentration of the circulating gas is maintained due to exchange with oxygen rich replacement gas.

Jonninen discloses a process for improved composting of organic matters in the traditional manner, wherein the gas circulation of the resulting gases and their partial exchange by fresh gas are one process step. Further, Jonninen contemplates only a single vessel for which his process takes place.

On the contrary, the present invention require that the liberation of both CO₂ and NH₃ takes place in a single step without the addition of acids or lyes.

The liberation is only based on the heating of the waste products to 40°C to 90° and the successive use of two pressure ranges (see claim 1 and patent application, page 4, lines 12-14). Simultaneous with the heating, the pressure is decreased to 10-30 kPa. Afterwards, the pressure is increased up to 40-80 kPa (see claim 1 and page 3, lines 10-11). The waste product stays within the stripping container (1).

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Based on this, CO₂ liberates initially from the liquid. At a slightly higher temperature NH₃ liberation takes place, without being accompanied by appreciable amounts of water. The liberation of both gaseous components in one step is based on the inventive process. The dual liberation is also reflected by the wording "the escaping gas containing carbon dioxide and ammonia" in claim 1.

No additional digester is necessary. Both gases are solely liberated due to controlling of pressure and temperature without addition of chemicals such as acids or lyes. Thus, no alkaline reagents such as lime (CaO) must be used. The process according to the present invention results in the liberation of CO₂ and NH₃ at a rate, which is necessary for the further progress of the process. Up to this point, the process occurs in one vessel, the stripping container (1).

Afterwards, the gas, which contains CO₂ and NH₃, is cooled and transferred into an aqueous absorption medium such as a gypsum suspension or brought into contact with this medium (see specification, page 6, line 17).

The transfer into a second vessel takes place, which is the collection container (2). Both gases CO₂ and NH₃ react to ammonia salts and calcium carbonate. Thus, the sub atmospheric pressure is maintained and the reaction continues autogenously if the temperature in the discharge container is kept at the predetermined level (see specification, page 5, line 27).

From the above, it is apparent that the present invention differs significantly from the Rickard patent and is also not obvious over a combination of Rickard and Jonninen.

Applicant hereby requests reconsideration and reexamination thereof.

No further fee or petition is believed to be necessary. However, should any further fee be needed, please charge our Deposit Account No. 23-0920, and deem this paper to be the required petition.

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With the above amendments and remarks, this application is considered ready for allowance and applicant earnestly solicits an early notice of same. Should the Examiner be of the opinion that a telephone conference would expedite prosecution of the subject application, he/she is respectfully requested to call the undersigned at the below listed number.

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Respectfully submitted,

A handwritten signature in black ink, appearing to read "Gerald T. Shekleton". The signature is fluid and cursive, with the first name "Gerald" being more prominent and the last name "Shekleton" following in a similar style.

Dated: 2 September 2009

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